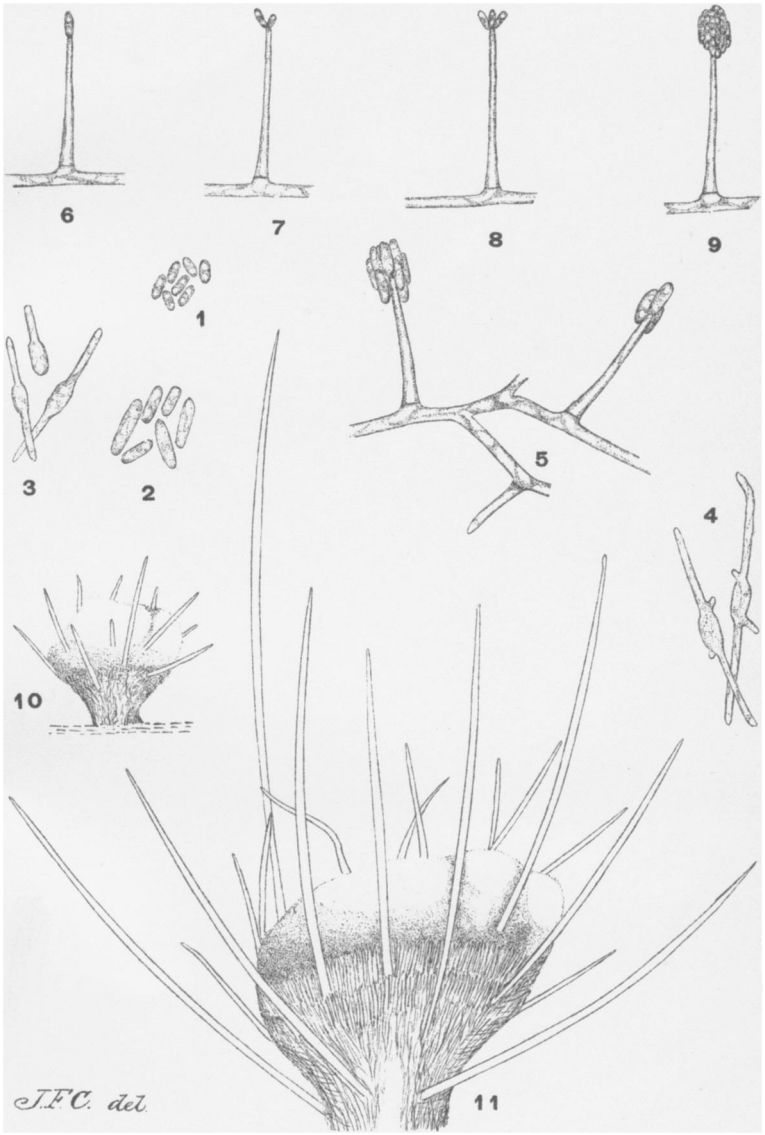

VOLUTELLA MELLEA Clark.

THE HELIOTYPE PRINTING CO., BOSTON.

A new Volutella

By Judson F. Clark

(Plate 371)

This fungus was found growing on dead leaves of *Pandanus Veitchii* in the greenhouses of the Botanical Department, Cornell University. Pure cultures were obtained by the ordinary dilution method, and germination and developmental phenomona were studied by growing the fungus in hanging-drop cultures in Van Tieghem cells.

An excellent medium for the development of this form was made by steeping 450 grams of sugar beet, sliced thin, in a liter of water for three hours at 100° C. After straining and cooling, the whites of two eggs were added, and the infusion was again boiled, then strained and filtered. To half the liter was added 6 grams of agar for a solid medium. This infusion of sugar beet and its corresponding agar were used with great satisfaction for the development of various fungi, and were found to be particularly well adapted for the development of many saprophytic forms.

Hanging-drops of the infusion and the agar were inoculated with a few spores from a pure culture. At 6 hrs. (Temp. 28° C.) the spores were germinating freely. The germ tubes were invariably developed from the ends of the conidia (*Plate 371, f. 3*) and in the first stages appeared to be simply a bulging out of the hyaline wall at these points. Two hours later the germ tubes had reached a length of about 20 μ and were beginning to branch by developing a branch close to the end of the original conidium, which could still be distinguished from the germ tubes by its greater diameter. This peculiarity of the first branching (*f. 4*) was quite constant in all cases observed. At 15 hours the cultures presented a mass of well branched, vigorously growing, non-septate mycelium.

At from 24 to 36 hours conidial fructifications of two distinct types made their appearance. The first to appear were the larger submerged sporophores bearing macroconidia. In origin, mode

of development, and appearance they resembled the aërial sporophores developed later, but differed from them in size, submerged habit, and character and number of conidia borne. In Fig. 5 is shown a branch of mycelium bearing the macrosporophores, two of which have developed conidia. This drawing was made from a culture in agar where the conidia were held *in situ* by the medium and could be counted. In general each macrosporophore produced 8–12 macroconidia. These latter were rather irregular in shape, varied greatly in size, and were obscurely two-guttate in appearance. The measurements varied from 3.5 $\mu \times 7\ \mu$ to 4.5 $\mu \times 18\ \mu$. Several of these macroconidia are shown in Fig. 2. In germination phenomena they were quite similar to the microconidia.

Some hours after the first appearance of the macrosporophores, smaller, aërial microsporophores were very abundantly developed. These were borne laterally on submerged, and laterally and terminally on aërial hyphae, and abstricted conidia from their apices exactly similar to those examined from the original sporodochia on leaves of *Pandanus*. In figures 6–9 the manner of development of these conidia is shown, and how they remain clustered at the apex of the sporophore, held in position by capillary moisture forming a mucro-like aggregation which sometimes contained a hundred or more microconidia.

On the tenth day sporodochia were observed in the agar cultures. The earliest stage observed was the development of a number of sporophores, in close proximity, bearing a large aggregation of conidia showing in mass a light honey color. Later, the characteristic setae began to make their appearance. Originating in the mass of hyphae near or at the base of the sporodochium, they passed outwards and upwards at varying angles emerging through the spore masses at varying points. The mature sporodochia in these cultures resembled very closely those originally found on *Pandanus*, but differed in having a somewhat more regular appearance and a richer yellow color, variations due no doubt to the altered conditions of development.

On sterile bean pods and sugar beet plugs the growth and conidial fructification was excellent, and quite similar to that already described for the sugar beet infusion and agar. No indication of a perfect (ascus) stage was observed.

The growth on plate cultures was quite characteristic. The center of the colony produced a bunch of fluffy aërial hyphae which was surrounded by a compact ring of rich lemon yellow spore masses, beyond which the mycelium grew out in radiating lines bearing innumerable sporophores and an occasional sporodochium. That this fungus is quite sensitive to changes of tem-

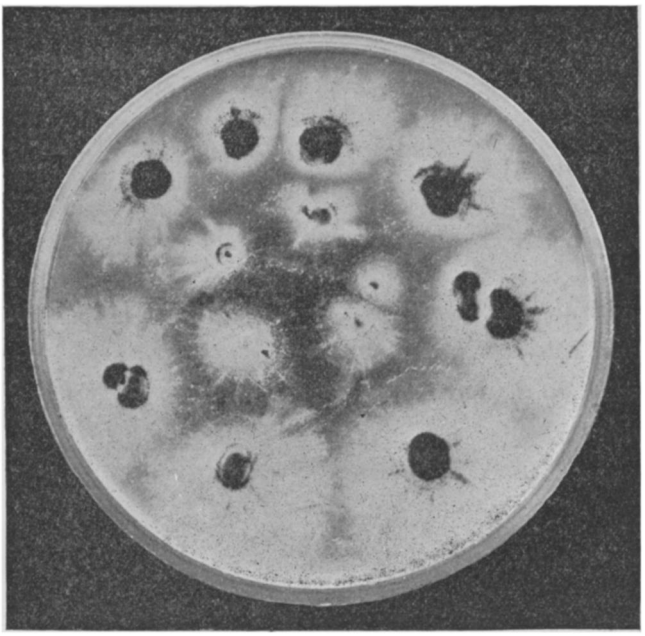

Plate culture of *V. mellea* on sugar beet agar. Grown at first in thermostat at 28° C., but afterwards on shelf in culture room. The fluffy hyphae in the center of the colonies is obscured by underlying spore masses.

perature was shown by the concentric markings of colonies in Petrie dishes kept in the laboratory where the temperature varied frequently and considerably during the development of the colonies.

Volutella mellea sp. nov.

Sporodochia substipate, irregularly hemispherical, at first white, then honey-colored, becoming brown in age. 100–150 μ in diameter, stratose; setae 10–60, arising irregularly from base of sporodochium and in many cases passing upwards through it, hyaline, continuous, slightly curved, tapering, very slightly roughened,

200–500 μ long x 2–7 μ in diameter; sporophores simple, continuous or rarely 1-septate, always cut off from the hypha by septum, 30–70 μ long, tapering from 2 ½ μ at base to 1 ½ μ at apex; conidia hyaline (when viewed singly), oblong, 2–2 ½ μ x 4–7μ, 2-guttate, forming great masses on top of sporodochium.

The species in many particulars resembles closely *V. ciliata* Fr., but differs from it in several important particulars as follow:

VOLUTELLA MELLEA.	VOLUTELLA CILIATA Fr.
Sporodochia at first white, becoming yellow later.	*Sporodochia* albo-carneis.
Stratose.	
Microsporophores 30 to 70 μ x 2 ½ μ at base to 1 ½ μ at apex. *Macrosporophores* somewhat larger.	Sporophores 10 to 15 μ x 1 μ.
Hyaline to honey-colored.	Hyaline or dilutely rose.
Microconidia distinctly 2-guttate.	
Macroconidia obscurely 2-guttate.	
On *Pandanus*.	On *Dicotyledons*.

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Explanation of Plate 371

1. Microconidia, × 500.
2. Macroconidia, × 500.
3. Microconidia germinating, × 600.
4. First branching of germ tubes.
5. Branch of mycelium bearing macrosporophores, from culture in sugar beet agar, × 500.

6–9. Microsporophores, showing different stages in the development of a "head" of microconidia, × 500.

10. A young sporodochium (diagrammatic), × 250.
11. A mature sporodochium, many of the spores removed, showing the stratose structure (diagrammatic), × 250.